MAASAI MARA UNIVERSITY

SPECIAL/RESIT UNIVERSITY EXAMINATIONS

ACADEMIC YEAR 2023/2024

SECOND YEAR SECOND SEMESTER EXAMINATION
FOR
THE DEGREE OF BACHELOR OF SCIENCE AND BACHELOR OF EDUCATION (SCIENCE)

COURSE CODE: FEM 2212

COURSE TITLE: GENETICS AND EVOLUTION

DATE: 18/4/24 **TIME: 1100-1300HRS**

INSTRUCTIONS

Answer **ALL** questions in **Section A** and any other **TWO** questions in **Section B**

Illustrate your answers with diagrams and give examples where appropriate.

SECTION A: (30 MARKS)

1. Briefly explain why genetics is crucial to modern biology. **(3 marks)**
2. Explain what the concept of the inheritance of acquired characteristics propose and how is it related to the notion of pangenesis. **(3 marks)**
3. Briefly define the following terms: **(3 marks)**
   (a)evolution; (b)allele; (c)genotype; (d)phenotype; (e)RNA; (f)genetics;
4. Outline the relations between genes, DNA, and chromosomes. **(3 marks)**
5. Sketch and label four different types of chromosomes based on the position of the centromere. **(3 marks)**
6. Discuss the use and biological significance of mitosis in living organisms. **(3 marks)**
7. A chromosome has the following segments, where • represents the centromere.
   A B C D E•F G What types of chromosome mutations are required to change this chromosome into each of the following chromosomes? **(3 marks)**

   (a) A B E•F G
   (b) A E D C B•F G
   (c) A B A B C DE•F G
8. Explain how Avery and his colleagues demonstrated that the transforming principle is DNA. **(3 marks)**
9. Briefly explain why Mendel's approach to the study of heredity was so successful. **(3 marks)**
10. Outline three general characteristics that a genetic material must possess. **(3 marks)**

SECTION B: (40 MARKS)

11. Write an essay on the theory of natural selection. **(20 marks)**
12. Describe various premating and postmating isolating mechanisms. **(20 marks)**
13. Describe various examples of sex chromosomal mechanisms of sex determination. **(20 marks)**

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